Applications

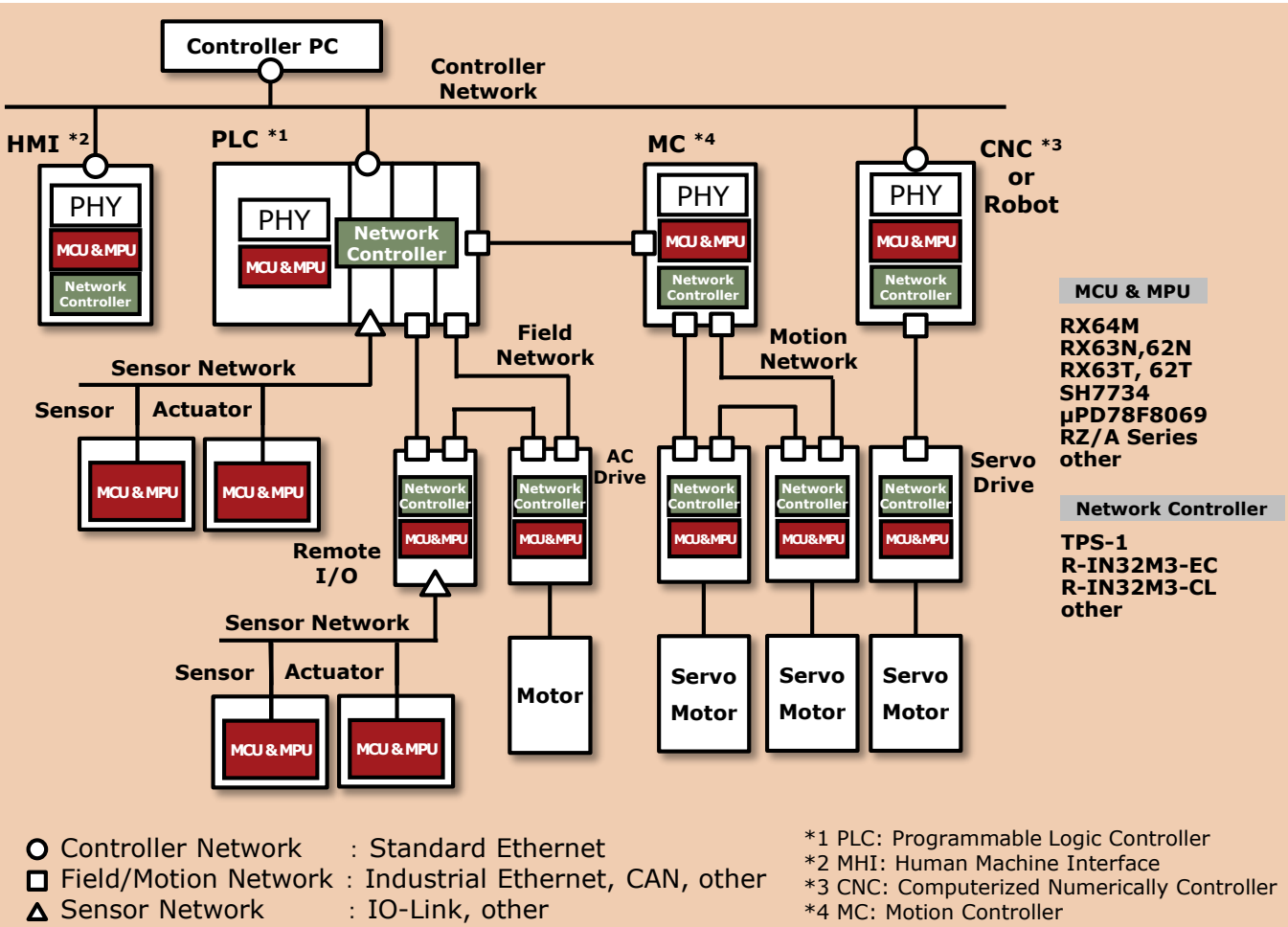
Industrial Network

Overview

Industrial networks connect a variety of factory facilities and equipment. The volume of information handled by industrial networks is rapidly increasing due to demands for higher precision equipment control and centralized control for more efficient productivity. The Ethernet communications standard is widely used for industrial networks due to its affinity for information system networks, high-speed broadband nature, and excellent cost performance.
Industrial applications in particular demand higher real-time response performance and environmental durability than standard Ethernet. Thus, more and more industrial networks are using industrial Ethernet protocols such as PROFINET, EtherCAT, and Ethernet/IP.

Meanwhile, devices in networks connecting sensors and actuators are nowadays becoming more compact and more precise, and use a digital communication standard called IO-Link.
To meet such market needs, in addition to microcontrollers and microprocessors with integrated Ethernet controller, IO-Link transceiver, and CAN, Renesas offers industrial Ethernet controllers with multiprotocol support for high performance and high reliability communications for industrial applications.

Industrial Network Tree



○ Controller Network : Standard Ethernet
□ Field/Motion Network : Industrial Ethernet, CAN, other
△ Sensor Network : IO-Link, other

*1 PLC: Programmable Logic Controller
*2 MHI: Human Machine Interface
*3 CNC: Computerized Numerically Controller
*4 MC: Motion Controller

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Recommended Products

As of February 2015

Block	Semiconductor device	Recommended products	Features, etc.
Ethernet Interface	Built-in network function MCU & MPU	RX64M	RXv2 32bit CPU, FPU Flash ROM:Max. 4MB(program)/64KB(data) Ethernet MAC x2ch, PTP controller(IEEE 1588 Precision Clock Synchronization Protocol) USB2.0 x2ch, CAN x3ch
		RX63N RX62N	RX 32bit CPU, 100MHz, FPU RX63N: Flash ROM: Max. 2MB(program)/32KB(data) RX62N: Flash ROM: Max. 512KB(program)/32KB(data) Ethernet MAC x1ch, USB2.0 x2ch, CAN x3ch(63N)/1ch(62N)
		SH7216	SH2A 32bit CPU, 200MHz, FPU Flash ROM: Max. 1MB(program)/32KB(data) Ethernet MAC x1ch, USB2.0 x1ch, CAN x1ch
		RZ/A Series (RZ/A1H, RZ/A1M, RZ/A1L)	ARM® Cortex®-A9 CPU, 400MHz, On-chip RAM: Max. 10MB, 2D Graphics accelerator, Ethernet MAC, USB2.0, CAN
		V850E2/MN4	V850E2M Dual CPU, 200MHz, FPU Flash ROM: Max. 2MB(program)/32KB(data) Ethernet MAC x1ch, USB2.0 x2ch, CAN x2ch
		V850E2/ML4	V850E2M CPU, 200MHz, FPU Flash ROM: Max. 1MB(program)/16KB(data) Ethernet MAC x1ch, USB2.0 x2ch, CAN x1ch
		SH7734	SH-4A CPU, 533MHz, FPU Cache memory : 32KB(instruction)/32KB(data) Gbit Ethernet MAC, USB2.0 x2ch, DDR2/3 controller
	PROFINET controller	TPS-1	Complete PROFINET functionality according to version 2.3 2 port integrated Ethernet PHYs(100Base-TX/FX) Integrated 32bit CPU and 512KB RAM
		ERTEC200 ERTEC400	PROFINET NRT/RT/IRT support, Integrated ARM946(150MHz) ERTEC200 : 2 port integrated Ethernet PHYs ERTEC400 : 4 port integrated Ethernet Controllers
	Multi Protocol Ethernet controller	R-IN32M3-CL	Integrated real-time OS accelerator and Ethernet accelerator Integrated CC-Link IE Field(slave) core and internal memory ARM Cortex-M3(100MHz), Gbit Ethernet MAC(2 port switch) CAN x2ch, CC-Link x1ch, UART x2ch, CSI x2ch, Timer x4ch
		R-IN32M3-EC	Integrated real-time OS accelerator and Ethernet accelerator Integrated EtherCAT(slave) core and internal memory ARM Cortex-M3(100MHz), 2 port integrated Ethernet PHYs CAN x2ch, CC-Link x1ch, UART x2ch, CSI x2ch, Timer x4ch
CAN Interface	Built-in network function MCU	RX63T RX62T	RX 32bit CPU, 100MHz, FPU RX63T: Flash ROM: Max. 512KB(program)/32KB(data) RX62T: Flash ROM: Max. 256KB(program)/32KB(data) CAN x1ch, USB2.0 x1ch(63T), LIN x1ch(62T), ADC, MTU3
		SH7239	SH2A 32bit CPU, 160MHz, FPU Flash ROM: Max. 512KB(program)/32KB(data) CAN x1ch, ADC, MTU2/MTU2S
		78K0R/Hx3	78K0R 16bit CPU, 24MHz Flash ROM: Max. 256KB(program)/16KB(data) CAN x1ch, UART, ADC
	CAN transceiver	R2A25416SP	ISO-11898-2 compliant, 1Mbps high-speed communication Standby mode support, SOP-8 package *: Under development
IO-Link Interface	IO-Link master MCU	μPD78F8069 *	78K0R 16bit CPU, 24MHz 2ch IO-Link Master(～230.4kbps) support CAN x1ch, DMAC x4ch, 10bit ADC x3ch

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Related Application Notes/Sample Code

Title	Document No.
RX Family TCP/IP for Embedded system M3S-T4-Tiny: Introduction Guide	R20AN0051EJ
RX600 Series CAN Application Programming Interface	R01AN0339EU
SH-2A TCP/IP for Embedded system M3S-T4-Tiny: Introduction Guide	R20AN0050EJ
SH7216 Group Ethernet PHY Board Design Guide	R01AN0935EJ
SH7216 Group Protocol Conversion Between Ethernet and RCAN Sample Program	R01AN0562EJ
SH7216 Group Reprogramming Flash Memory in User Program Mode Using an Ethernet Connection	R01AN0289EJ
SH7216 Group Protocol Conversion between Ethernet and USB	R01AN0066EJ
SH7216 Group Configuring the Ethernet PHY-LSI Auto-Negotiation	R01AN0053EJ
SH7216 Group Configuration to Receive Ethernet Frames	R01AN0052EJ
SH7216 Group Configuration to Transmit Ethernet Frames	R01AN0051EJ
V850E2/ML4 Ethernet Send/Receive Setup Example	R01AN1018EJ
SH7734 Group Example of Ethernet Transmit Settings	R01AN0895EJ
SH7734 Group Example of Ethernet Receive Settings	R01AN0898EJ
SH-4 TCP/IP for Embedded system M3S-T4-Tiny: Introduction Guide	R20AN0072EJ
R-IN32M3 Series Programming Manual (OS edition)	R18UZ0011EJ
R-IN32M3 Series Programming Manual (Driver edition)	R18UZ0009EJ
R-IN32M3 Series User's Manual (Board design edition)	R18UZ0021EJ

Related Software

Title	Document No.
Ultracompact TCP/IP protocol stack : M3S-T4-Tiny for the RX Family	R20AN0051EJ
Ultracompact TCP/IP protocol stack : M3S-T4-Tiny for the SH-2A	R20AN0050EJ
Ultracompact TCP/IP protocol stack : M3S-T4-Tiny for the SH-4	R20AN0072EJ
Sample software for R-IN32M3	-

Related Boards

Name	Part No.
TPS-1 Starter Kit *	SK-TPS-1
ERTEC Series Development Kit *	ET-D800261DK-0001 (ERTEC200) ET-D800232DK-0001 (ERTEC400)
R-IN32M3 Development Kit	TS-R-IN32M3-CL TS-R-IN32M3-EC TS-R-IN32M3-CEC KSK-RIN32M3EC-LT-IL
IO-Link Master Starter Kit *	-

* : Please contact your sales representative or contact us directly.

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- The RTOS accelerator utilizes dedicated technology based on the ARTESSO architecture of Kernelon Silicon.

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Renesas Electronics America Inc.
2801 Scott Boulevard Santa Clara, CA 95050-2549, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 1709, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100191, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, P. R. China 200333
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok,
Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050
Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL Ⅱ Stage, Indiranagar, Bangalore, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.
12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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